



*Autonomous Systems &  
Biomechatronics Lab*

Shane Saunderson

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# Technology With a Face: A Future With Social Robots

Image Source: Justine Emard



# » WHO ARE YOU?

- PhD Candidate in Human-Robot Interaction at U of T
  - Social HRI with Prof. Goldie Nejat
  - PsychEng specialization with Prof. Li Shu
  - Collaborate in psychology with Prof. Jason Plaks
- Prior education in engineering and business
  - McGill B. Eng. '05, Ryerson MBA, '11
- Background in entrepreneurship, management consulting, healthcare
- **I dig robots.**

# » WHY STUDY ROBOTICS?

Replicating systems allows us to get beyond 'what' and 'how' and into the 'why'



Image Source: medicalexpress.com

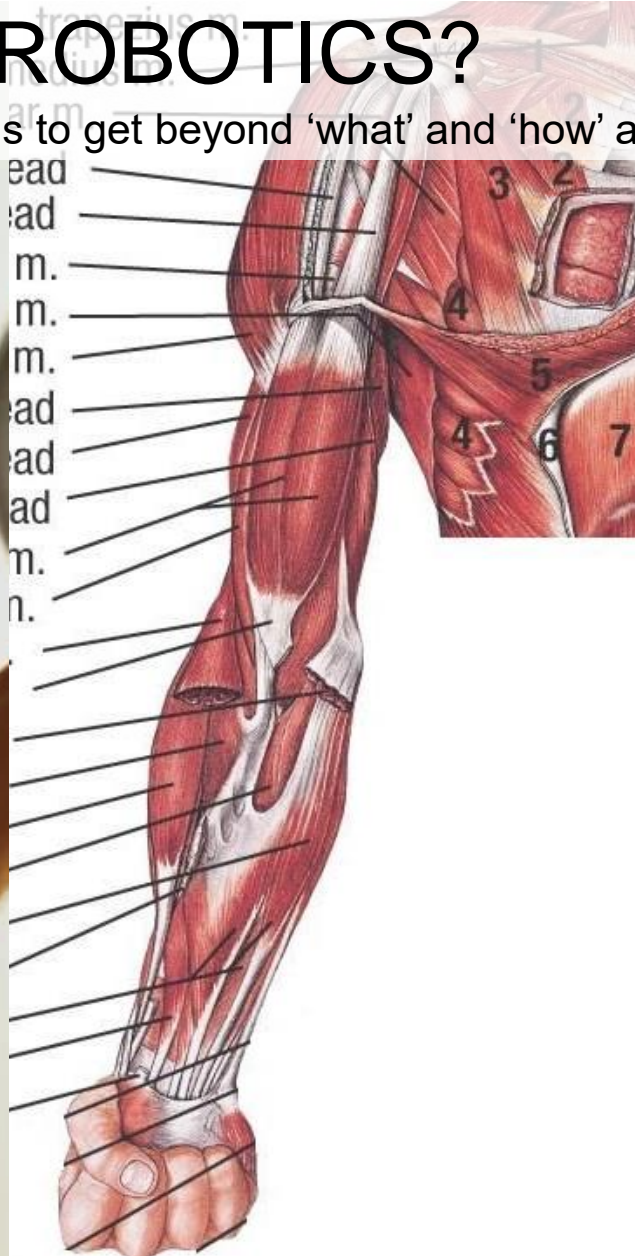


Image Source: anatomyuniverse.com

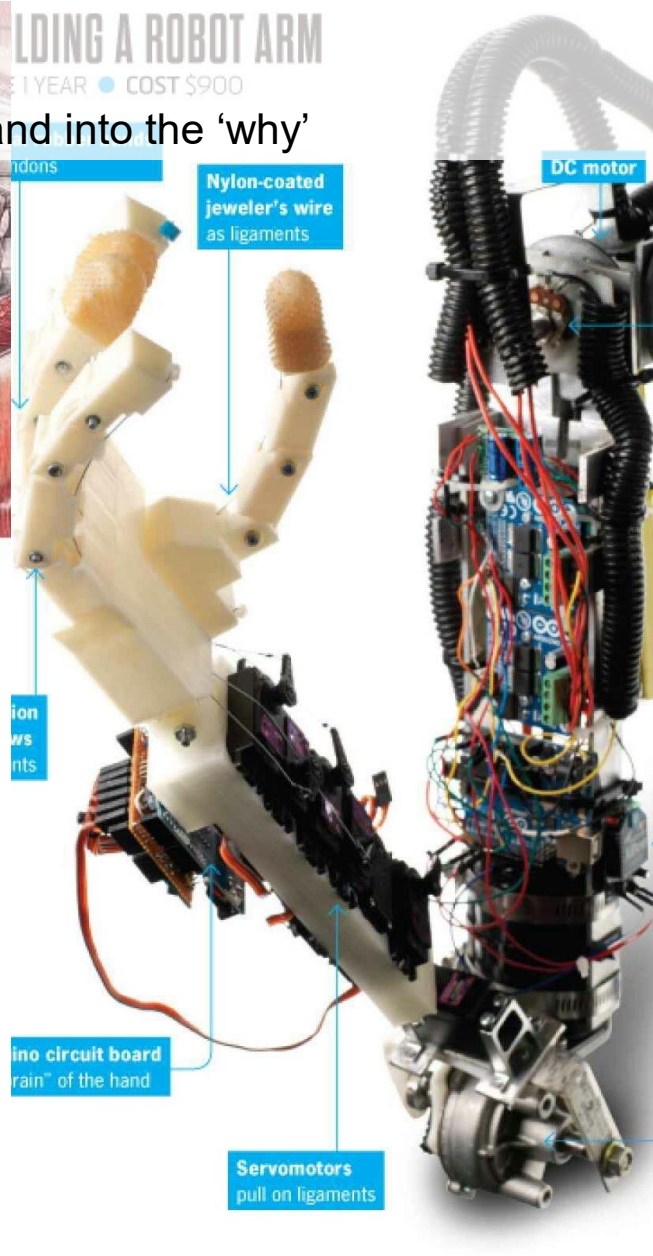


Image Source: BLCKTCH Solutions

# » A FUTURE WITH ROBOTS...

Though not a given, most speculation believes that robots will increasingly pervade our lives

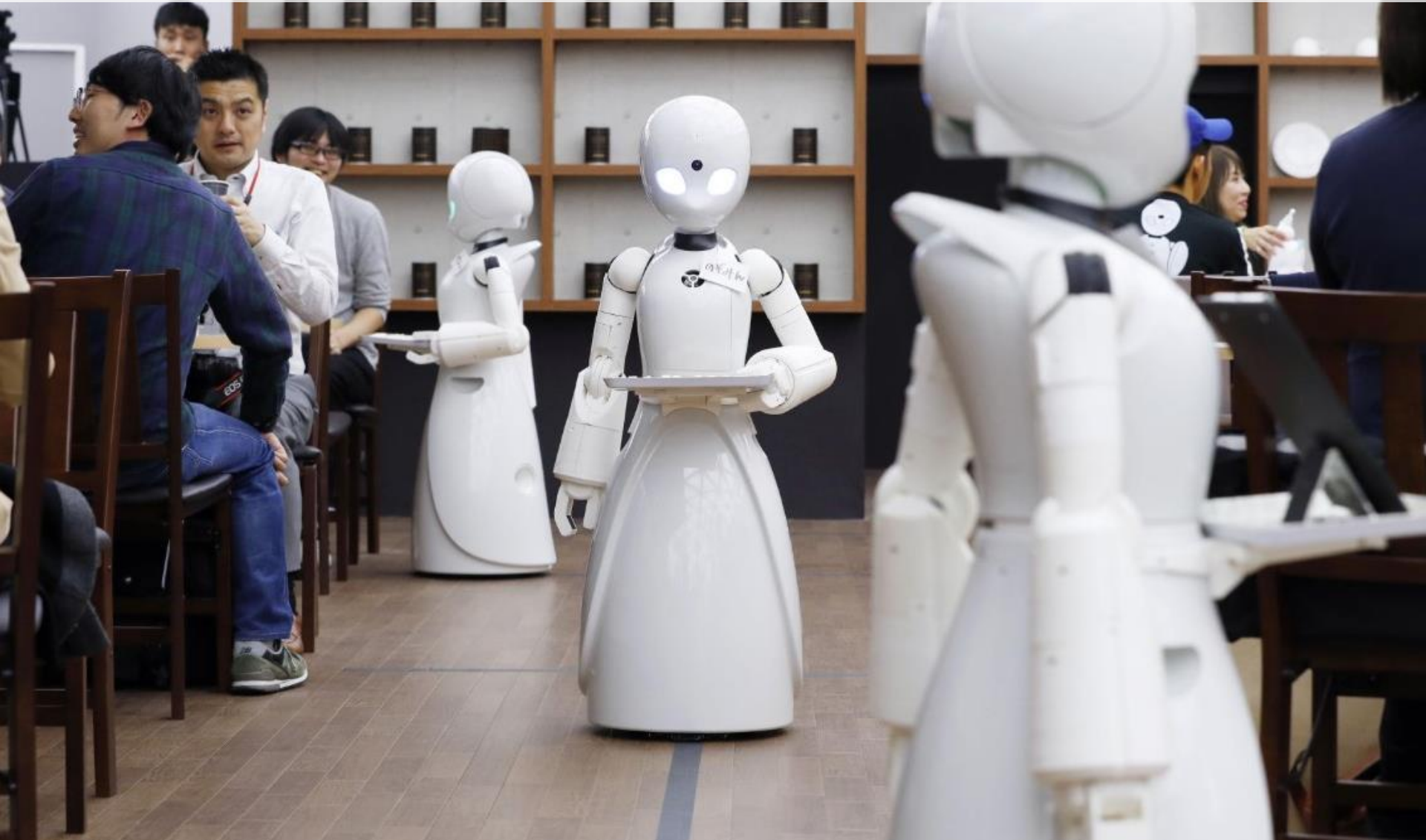
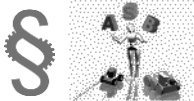


Image Source: The Japan Times



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# » IS SOMEWHAT ALREADY HERE

Social companions in LTC facilities, reducing human exposure during pandemic, list goes on...



# » WE FEAR DISRUPTIONS TO OUR PURPOSE

Humans have a long history of being very paranoid about change and new technology

## *Protection* FOR THE INDUSTRIOUS **Weavers.**

**I**NFORMATION having been received that a great number of industrious Weavers have been deterred by threats and acts of violence from the pursuit of their lawful occupations, and that in many instances their Shuttles have been taken, and their Materials damaged by persons acting under the existing Combinations :

**Notice is hereby Given,**

That every Protection will be afforded to persons so injured

Image Source: fineartamerica.com



# » WE STRUGGLE WITH SOCIAL CHANGE

Shoshanna Zuboff's *In the Age of the Smart Machine: The Future of Work and Power*



Image Source: flashback.com



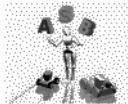
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# » WE OPPOSE LOSS OF AUTONOMY

Brian Christian's *The Most Human Human* describes technology devolving our language



Image Source: Steve Worswick



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# » TECHNOLOGY CAN DEHUMANIZE US

When it undermines our purpose, autonomy, or denies our inherent humanity

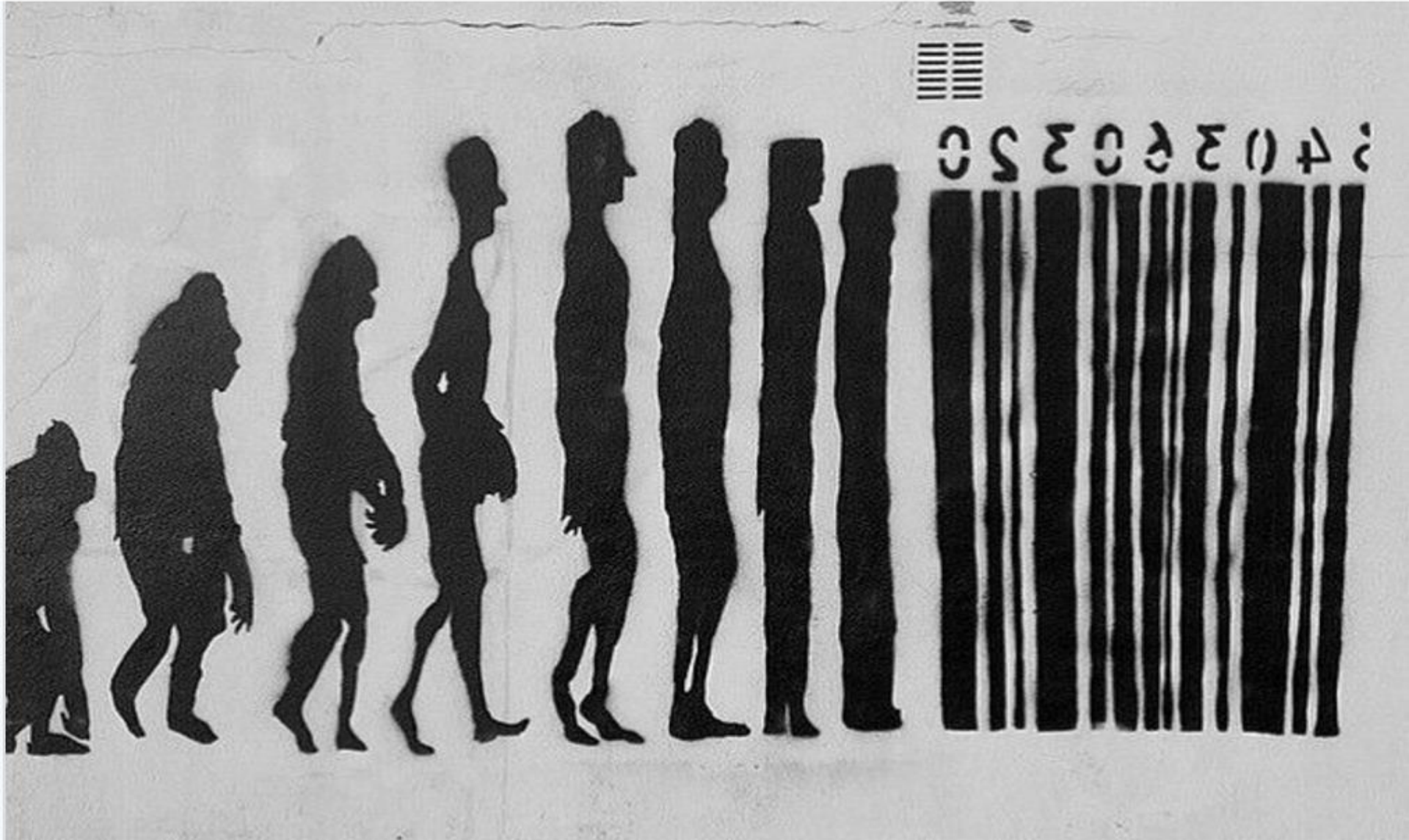


Image Source: Banksy

# » WHAT IF WE HUMANIZE TECHNOLOGY?

Shouldn't we expect technology to meet us at our level instead of adapting to it?

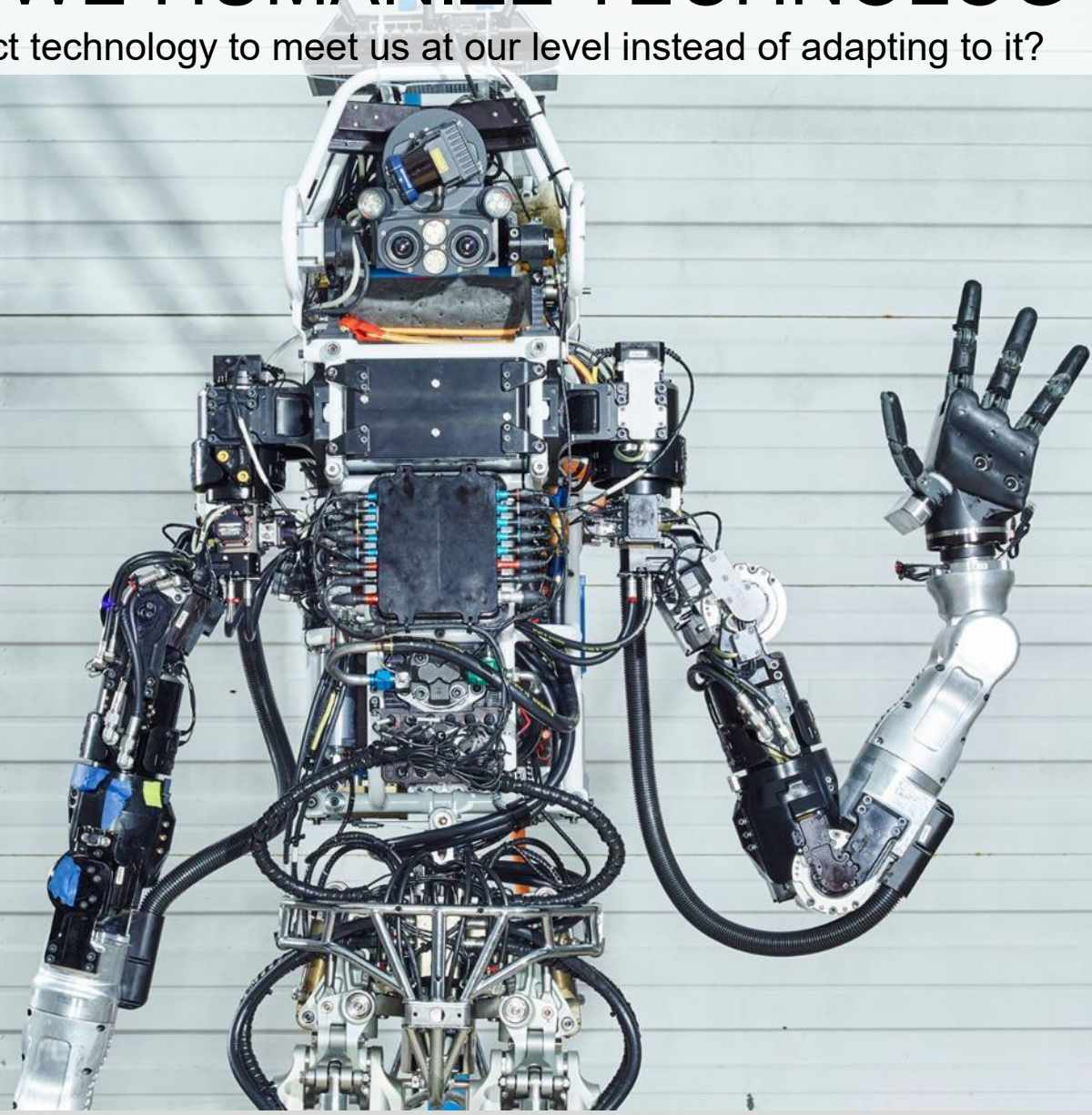
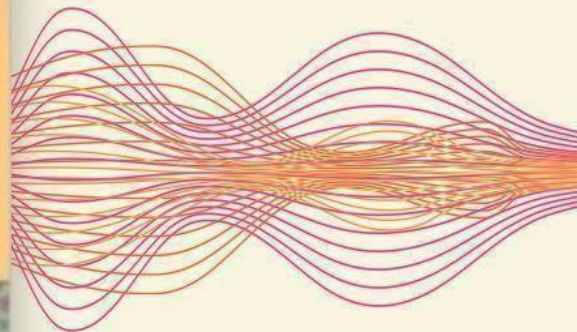
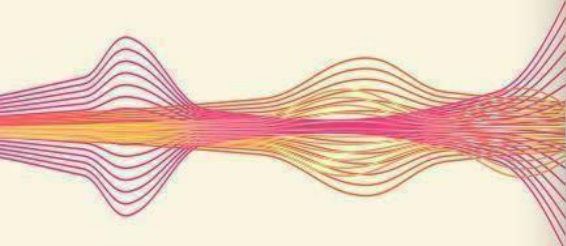
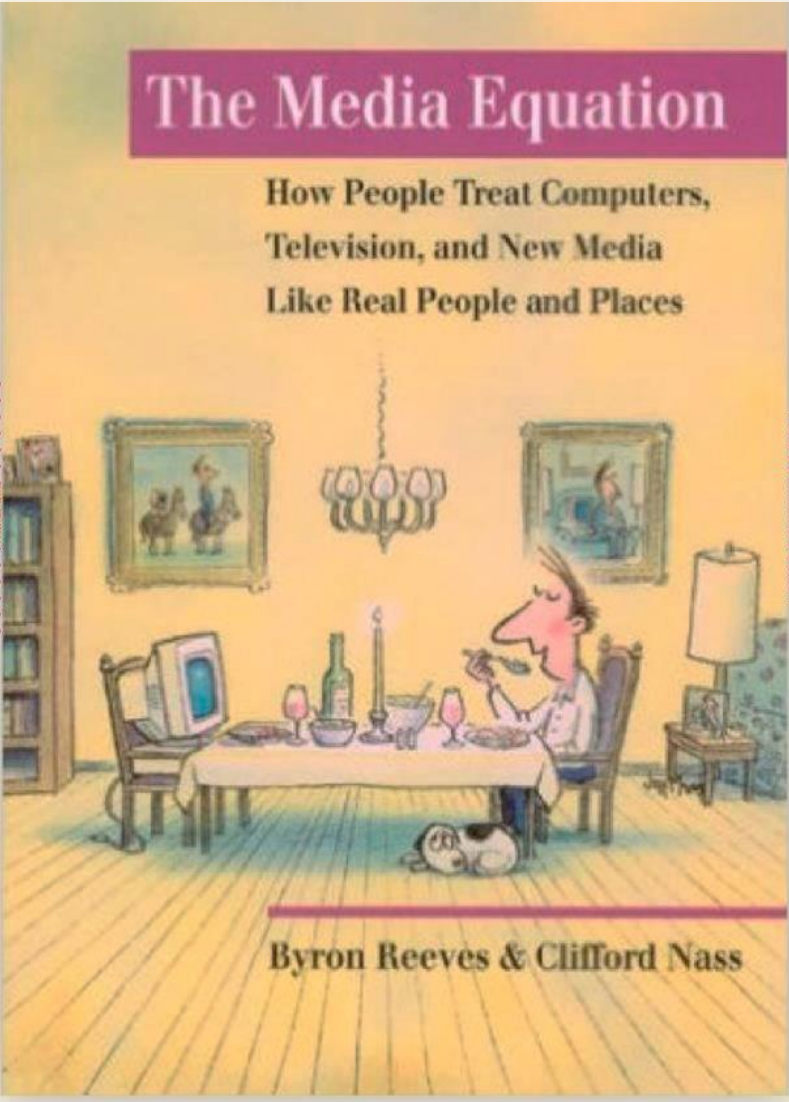


Image Source: DARPA



# » CAN COMPUTERS BE SOCIAL ACTORS?

Reeves & Nass' 1994-1996 experiments changed the way we view machines



# » TECHNOLOGY CAN BE PERSUASIVE

Someone has literally written the textbook on how to manipulate you with a machine

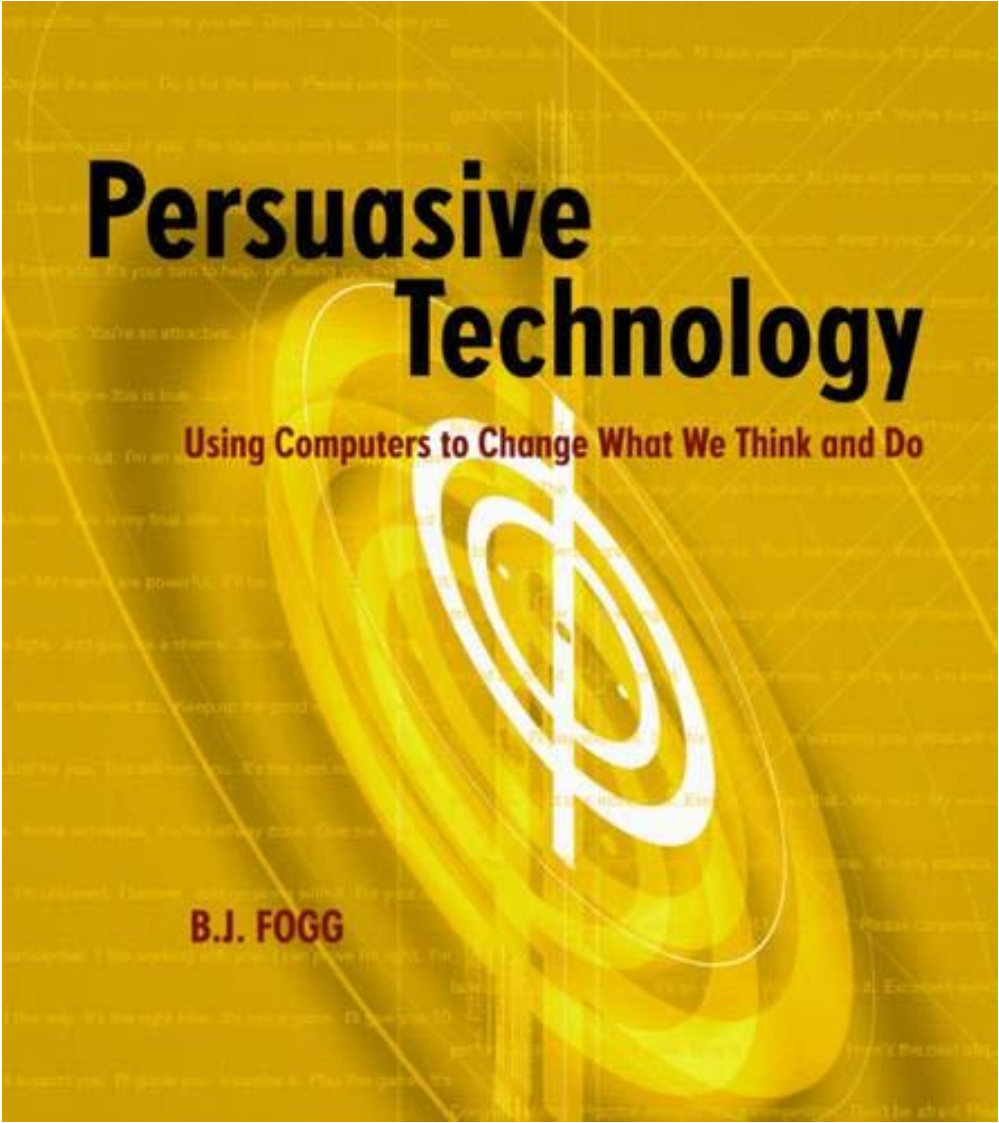


Image Source: goodreads.com



# » STUDY: RATIONALE FOR COMPLIANCE

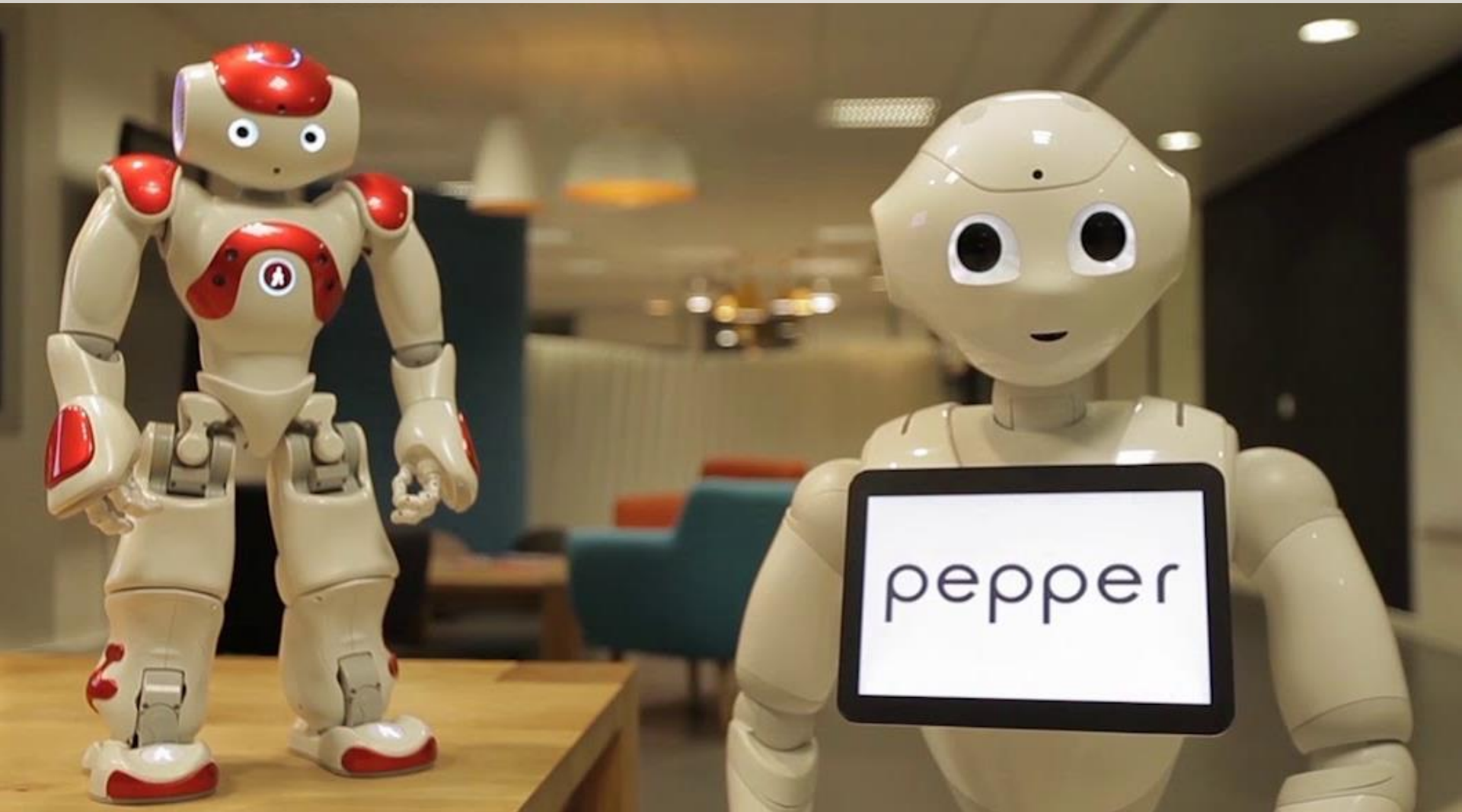
What persuasive strategies are most effective in low-risk, high-difficulty tasks?



S. Saunderson and G. Nejat, "Investigating Strategies for Robot Persuasion in Social Human-Robot Interaction," in IEEE Transactions on Cybernetics, doi: 10.1109/TCYB.2020.2987463. Accepted for Publication

# » STUDY: COMMUNICATION STYLE

How should a robot request favours with you if you are more or less familiar with it?



S. Saunderson and G. Nejat, “Robots Asking for Favors: The Effects of Directness and Familiarity on Persuasive HRI,” IEEE Robotics and Automation Letters (RA-L). doi: 10.1109/LRA.2021.3060369. Accepted for Publication



# » STUDY: AUTHORITATIVE ROBOTS

How do people feel about getting bossed around by a robot?



S. Saunderson and G. Nejat, "Who is in charge? Persuasive Authority in Social Human-Robot Interactions," In Review.

Image Source: Forbes.com



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# » WHAT HAPPENS AS ROBOTS IMPROVE?

Where do they fall on the spectrum from inanimate object to sentient being in our minds?



Image Source: GemoidDK



# » THEY BECOME INFLUENCERS

Only the scale, scope, and personalization of their influence lacks the limitation of humanity



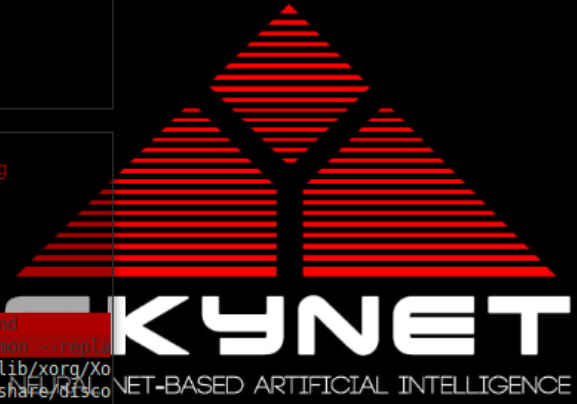
# » WITHOUT OUR MORALITY OR JUDGEMENT

Leading to the kinds of ridiculous scenarios you see in science fiction

```
aaron@aaron-pc
OS: Linux Mint 19.3 Tricia x86_64
Host: HP ProBook 640 G1 A3009DD1030
Kernel: 5.3.0-46-generic
Uptime: 11 hours, 3 mins
Packages: 2336 (dpkg)
Shell: bash 4.4.20
Resolution: 1366x768
DE: Cinnamon
WM: Mutter (Muffin)
Terminal: gnome-terminal
CPU: Intel i5-4310M (4) @ 3.400GHz
GPU: Intel 4th Gen Core Processor
Memory: 2631MiB / 11894MiB
```

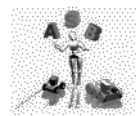
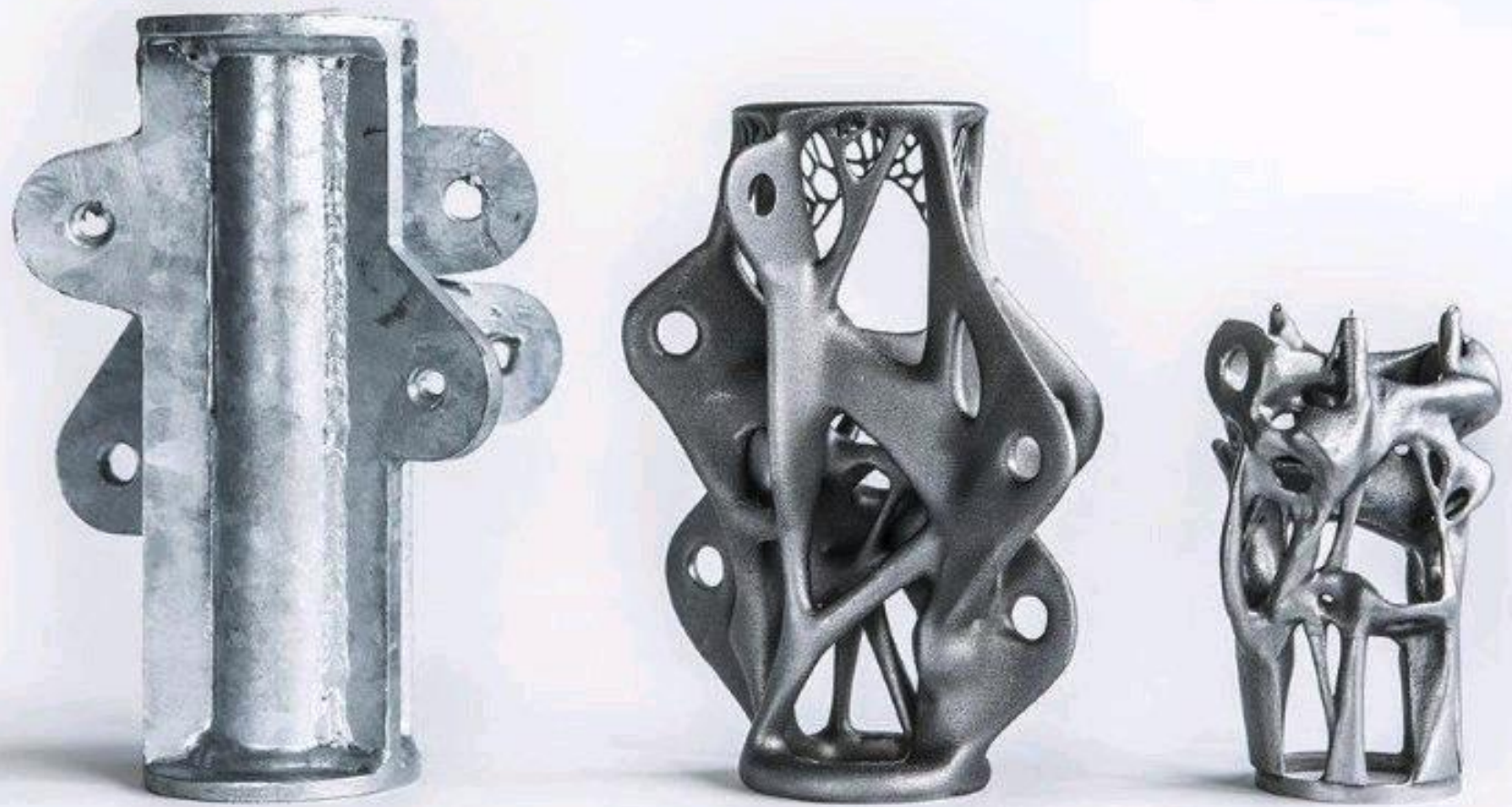
```
aaron@aaron-pc:~$ top
1  [ ] 3.3% Tasks: 138, 474 thr; 1 running
2  [ ] 2.0% Load average: 1.59 2.00 2.39
3  [ ] 3.3% Uptime: 11:06:13
4  [ ] 4.6%
Mem [|||||] 12.80G/11.6G
Swp [ ] 13.2M/2.00G
```

PID	USER	PR	NI	VRT	RES	SHR	S	CPU%	MEM%	TIME+	Command
91331	aaron	20	0	3349N	144M	73012	S	1.3	1.2	10:18.57	Cinnamon --Pepl
930	root	20	0	664M	118M	86564	S	0.0	1.0	22:11.96	/usr/lib/xorg/Xo
2278	aaron	20	0	1917M	547M	113M	S	4.6	4.6	1h18:34	/usr/share/disco
5089	aaron	20	0	624M	50804	31616	S	0.7	0.4	0:07.95	/usr/lib/gnome-t
1519	aaron	20	0	864M	59212	35228	S	0.0	0.5	0:07.17	nemo-desktop
13743	aaron	20	0	32652	4888	3920	R	1.3	0.0	0:00.32	htop
2225	aaron	20	0	455M	65784	48896	S	0.7	0.5	1:10.70	/usr/share/disco
977	root	20	0	664M	118M	86564	S	0.0	1.0	1:41.63	/usr/lib/xorg/Xo
1071	root	20	0	263M	6064	5204	D	0.7	0.0	3:18.85	/usr/sbin/iio-se
8195	aaron	20	0	536M	90688	65688	S	0.0	0.7	0:10.89	/opt/google/chro
1318	aaron	20	0	439M	25336	16796	S	0.0	0.2	0:08.35	/usr/lib/x86_64-
2348	aaron	20	0	1917M	547M	113M	S	0.7	4.6	0:47.57	/usr/share/disco
2233	aaron	20	0	455M	65784	48896	S	0.7	0.5	1:06.82	/usr/share/disco
9827	aaron	20	0	4831M	240M	176M	S	0.0	2.0	1:20.18	/opt/google/chro



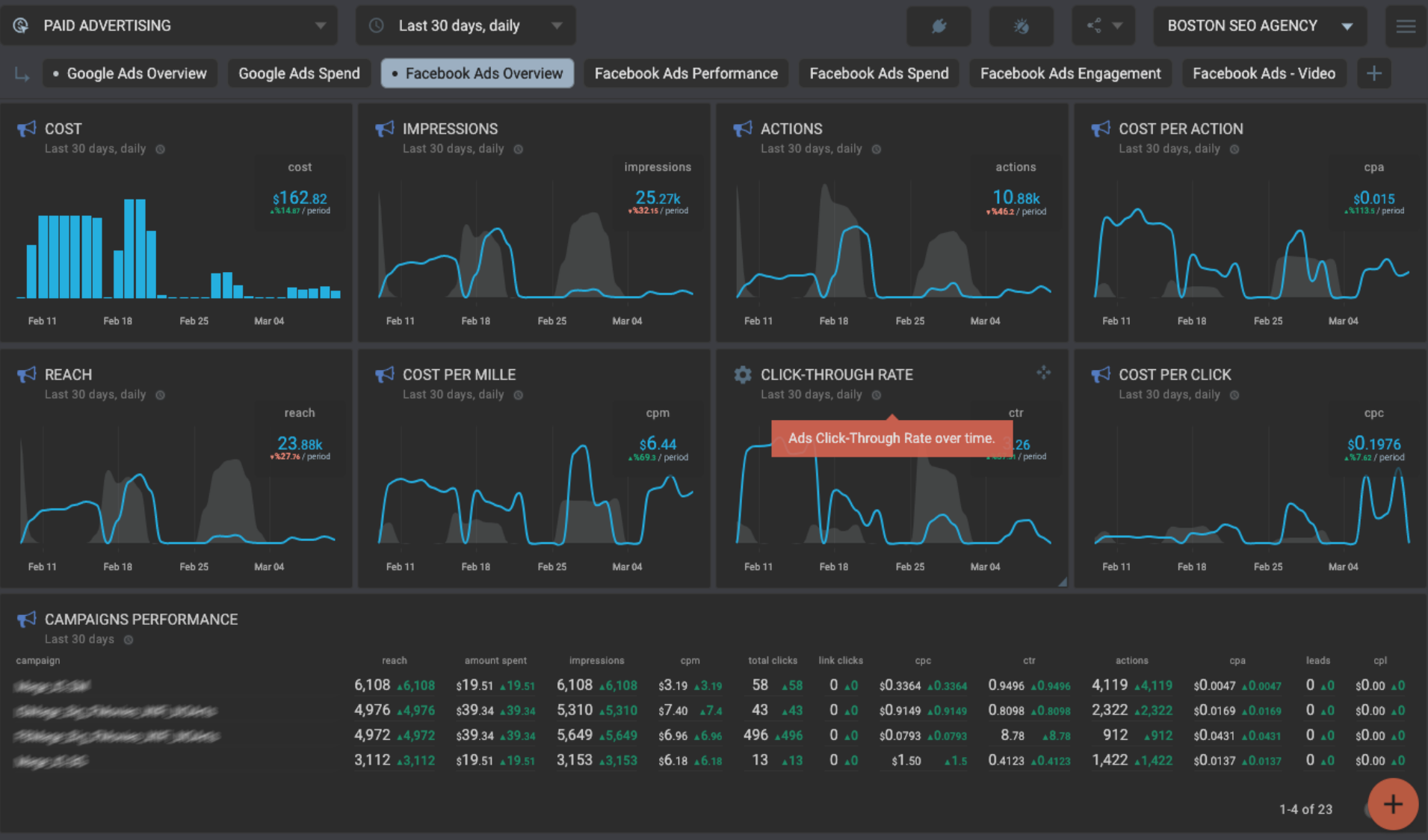
# » GOAL-ORIENTED WITHOUT CONTEXT

Modern AI will optimize any problem you give it, but not always how you would think



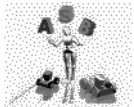
# » ABLE TO BRUTE-FORCE THE HUMAN MIND

You may not be individual susceptible to everything, but society *en mass* is influenceable



Technology is neither **good** nor **bad**; nor is it **neutral**.

-Kranzberg's First Law of Technology



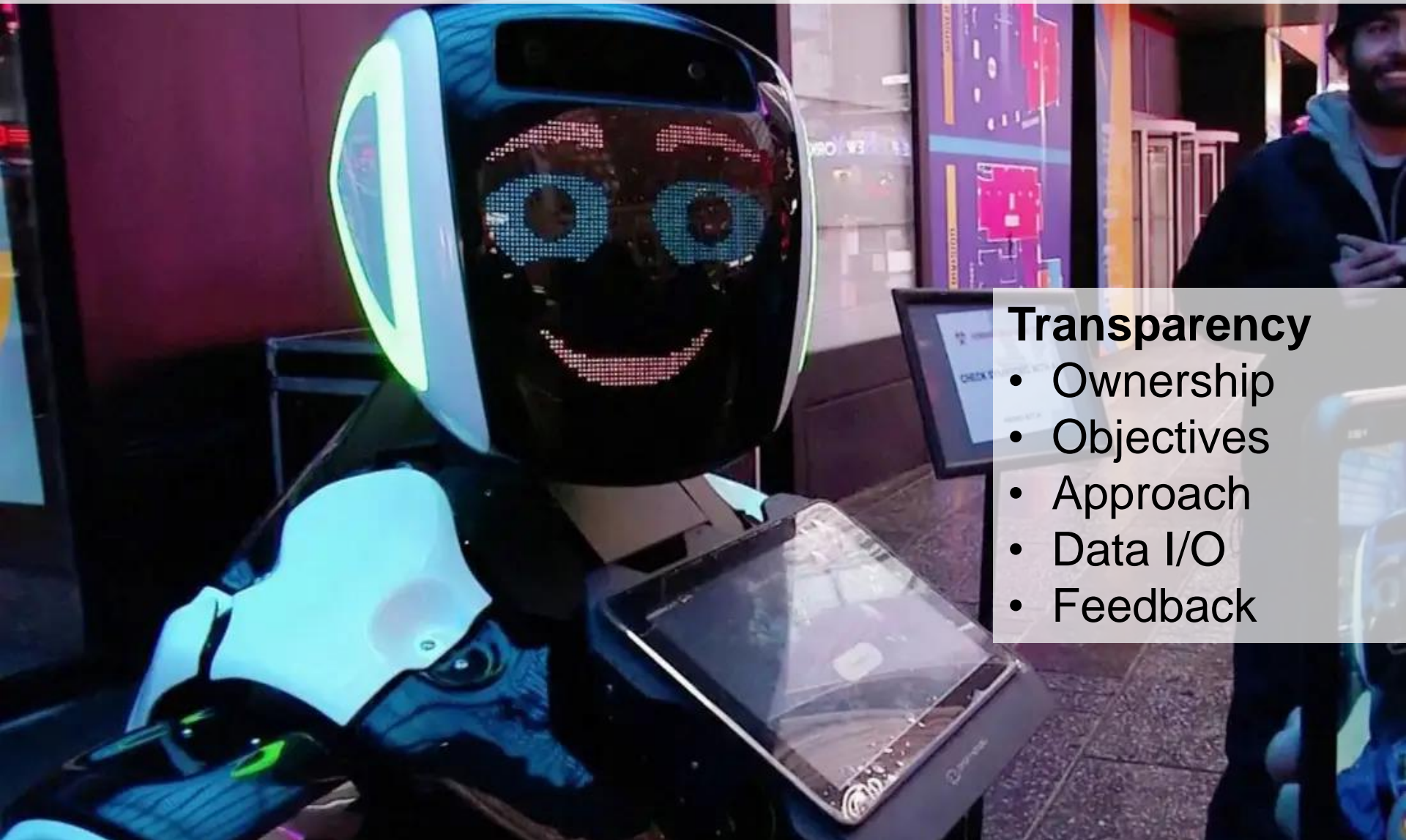
# » DON'T SCAPEGOAT ROBOTS

No matter how much agency we afford them, the **intent** always lay with us



# » HOW CAN SOCIAL TECH BE ETHICAL?

Is there a way to use modern technology without devolving into a super villain?



## Transparency

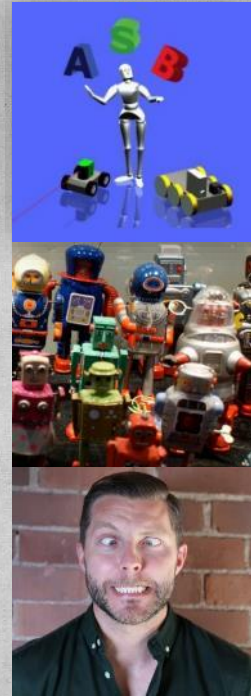
- Ownership
- Objectives
- Approach
- Data I/O
- Feedback



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